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WHAT CONSTITUTES SYNONYMY?

BY C. H. TOWNSEND,
Lima, Peru.

On page 84, article 9, volume 68, Proc. U.S.N.M. (1926), under the head of *Eumacronychia*, there appears the following statement: "This genus, erected by Townsend in 1892, has long been considered synonymous with *Hilarella* and has never been generally accepted."

On page 95 of the same article, under the head of *Gymnoprosope*, there appears: "This genus also has long been considered synonymous with *Hilarella*."

The author of the article, Mr. Harry W. Allen, of Mississippi, quotes my references to both genera up to 1908 and those of Coquillett up to 1910, and apparently considers that the latter's repetition of synonymy in 1910 negatives my 1908 restoration of the genera. Quite probably he is technically correct in this matter.

I have never considered it necessary to refute the synonymy published by Coquillett in his 1910 list of genotypes. His synonymy as set forth in 1897 is so glaringly wrong that it is entitled to little notice, and his 1910 synonymy is practically a repetition of it. Having refuted the first, there is no necessity to refute the repetition.

I must of course compliment Mr. Allen on recognizing the validity of these genera and I am naturally gratified to see anyone espouse their cause, but to say that they have long been considered synonymous with *Hilarella* does not state the case at all. The truth of the matter is that Mr. Allen is the first student after myself who has seen material and been competent to recognize the validity of these genera. I have never for a moment considered them synonymous with *Hilarella*. Such synonymy is quite ridiculous. As to the rest of the world, no one competent to form an opinion had studied material, hence no opinion existed but rather a complete indifference. Nobody cared a snap whether these genera were synonyms or not.

This forcibly illustrates what a power lies concealed in the weapon synonymy. A careful worker may erect valid genera and species. An ignorant or malicious person may publish an article stating that these valid genera and species are synonyms, and henceforth they bear the synonymic stigma. The general public is not competent to judge of the merits of the case, and besides has troubles of its own. No one cares a snap about the matter unless he is making a special study of the group in question. The original author may publish a refutation of the synonymy. Nobody pays any attention to him, the public not being interested, and his refutation is quickly forgotten. Fifty years later, a competent worker recognizes these genera and species as valid and concludes that they have lain in the synonymy a half century. Is he technically correct in this view?

Synonymy has too long masqueraded as a court of permanent and infallible decisions. There is nothing final about synonymy. Most of the muscoid synonymy given in the Aldrich catalogue is wrong. Probably well over half of the

synonymy published in the Bezzi & Stein catalogue is wrong. A great part of that given in Stein's posthumous work is wrong. Practically all synonymy is merely the personal opinion, well or ill formed, of a single individual.

The synonymic pronouncements of a single individual carry weight in exact ratio to his ability in the groups concerned. But the general public has no means of judging of his ability. If he sets himself up as a specialist and speaks with confident authority, the public accepts him at his own valuation. He is henceforth at liberty to inflict his personal opinions on a long-suffering public and to manufacture synonymy ad libitum. This is the easiest thing in the world to accomplish as long as the manufacturer escapes detection as a fraud. In fact, it may be termed systematic pastime. He is knocking everything on the head right and left as suits his fancy, while the public looks on unconcerned and practically uninterested. He is destroyed, not building, but no one cares except the original builder who notes the attempt to level to the ground his laboriously erected edifices. Yet they are not really levelled and their status is just as good as before until the synonymy in question is abundantly endorsed.

If ten or a dozen of the foremost specialists in a given group should all agree on a point of synonymy, it may be considered as pretty well established provided that each has thoroughly studied the matter independently. No pronouncement can be considered as established synonymy until it has received the sanction of at least ten well qualified experts. The opinion of one person, seconded by another who merely takes the other's word for it, can not give standing to synonymy. This strong weapon synonymy is not to be left at the beck and call of every individual.

I should add that I do not accept the synonymy given in Mr. Allen's paper. There are very few persons yet qualified to pronounce on specific identity in the muscoid flies, and it is amply evident from their published writings that Messrs. Allen and Aldrich are not among the number, though the former shows marked ability in this direction. Mere similarity of male genitalia does not constitute specific identity. Close agreement in many other characters is needed in addition.

DESCRIPTIONS OF SEVEN NEW SPECIES OF THE GENUS ORTHOTYLUS FIEBER (HEMIPTERA, MIRIDAE).*

BY HARRY H. KNIGHT,

Ames, Iowa.

Orthotylus notabilis new species.

Allied to *basicornis* Kngt., but easily distinguished by the much larger size, shorter rostrum which only attains posterior margin of sternum, and by the fuscous markings of the male.

♂. Length 6.7 mm., width 2.1 mm. Head: width 1.17 mm., vertex .44 mm. Rostrum, length 1.63 mm., just attaining hind margin of sternum. Antennae: segment I, length .58 mm., black; II, 2.04 mm., fuscous; III, 1.15 mm., fuscous; IV, .62 mm. Pronotum; length 1.03 mm., width at base 1.82 mm.

General coloration green or yellowish green, spot on inner apical angle of corium, a confluent spot on clavi just behind cuneus, mesoscutum largely, spot

*—Contribution from the Department of Zoology and Entomology, Iowa State College, Ames, Iowa.

each side on basal margin of pronotum just opposite lateral margins of mesoscutum, basal margin of calli, sometimes spot each side of frons, spot on lora, sides of thorax, sternum, and the venter, fuscous to blackish; membrane uniformly dark fuscous, veins green. Clothed with simple but rather stiff and prominent, pale pubescence. Genital claspers very similar to those of *neglectus* Kngt., but easily distinguished from that species by size and coloration.

• ♀. Length 6.7 mm., width 2.4 mm. Head: width 1.15 mm., vertex .52 mm. Antennae: segment I, length .62 mm., black; II, 2.07 mm., greenish yellow to dusky; III, 1 mm., yellowish to dusky; IV, .58 mm., fuscous. Pronotum: length 1.12 mm., width at base 2.04 mm. Differs from the male in the uniformly green color, except first antennal segment is black. Coloration very similar to *basicornis* but distinguished by the shorter rostrum which only attains posterior margin of sternum, and by the much larger size.

Holotype: ♂ June 13, 1923, Brookings, South Dakota (H. C. Severin); author's collection.

Allotype: ♀ July 18, 1922, Ramsey County, Minnesota (H. H. Knight).

Paratypes: 2♂, topotypic. 2♀, taken with the allotype. 8♂ ♀ June 5, Riley County, Kansas (P. J. Parrot). ♀ July 10, 1925, Saskatoon, Sask. (N. J. Atkinson); Canadian National collection.

***Orthotylus fuscicornis* new species.**

Allied to *hamatus* Van D., but differs in the blackish antennae, longer second antennal segment, prominent white pubescence, and in structure of the male genital claspers.

♂. Length 5.6 mm., width 1.8 mm. Head: width .99 mm., vertex .47 mm. Rostrum, length 1.48 mm., slightly exceeding posterior margin of sternum, green, black on apex. Antennae: segment I, length .48 mm.; II, 1.72 mm., exceeding the width of pronotum at base; III, .92 mm.; IV, .50 mm.; black, in pale specimens segment II may be more fuscous than black. Pronotum: length .86 mm., width at base 1.49 mm.

Color pale to bluish green, pronotum behind calli, corium, and longitudinally along middle of clavus, darker green; an arc each side of frons and confluent above, base of tylus, spot each side of vertex, collum, antennae, tip of rostrum, posterior margins of calli, the sloping lateral margins of mesoscutum, fuscous to black. Membrane whitish hyaline, veins green, anal area fuscous bordering anal vein. Dorsum clothed with prominent white pubescence, nearly as in *basicornis* Kngt. Legs green, tarsi fuscous, tibial spines yellowish. Genital claspers distinctive, right clasper in the form of a thick, ligulate process, slightly sinuate on ventral margin, curved inward only on basal third, extending beyond middle of genital segment, its apex truncate, the lower apical angle produced into a sharp point, the dorsal angle rounded, set with three or four small spine-like teeth on end margin, apical portion of clasper distinctly thickened, sub-terete as viewed from the end; basal one-third of clasper broader, rounded off at shoulder, produced distally in a thumb-like process which is nearly parallel with the main clasper, tapering to a point and bearing several small teeth-like spines which are irregularly distributed; the extreme basal portion of clasper, which is sometimes obscured by margin of genital segment, bears an erect process, the acuminate apex

of which is divided into two or three short spines. Left clasper much as in *basicornis*, but the dorsal prong shorter and tapering gradually to a point.

♀. Length 5.6 mm., width 1.8 mm. Head: width 1.02 mm., vertex .56 mm. Antennae: segment I, length .47 mm.; II, 1.57 mm.; III, .86 mm.; IV, .46 mm. Pronotum: length .83 mm., width at base 1.57 mm. Coloration usually paler than in the male, dark markings of the dorsum usually lacking except on base of tylus; antennae greenish yellow above, the black color restricted to ventral aspect of segment I, and fuscous only on base of segment II.

Holotype: ♂ August 12, 1925, South Fork, Colorado (H. H. Knight); author's collection.

Allotype: same data as the type.

Paratypes: 16 ♂ ♀, taken with the types on willow (*Salix* sp.). COLORADO—7 ♂ ♀ Aug. 19, 1898, Dixon's Canyon, near Fort Collins; ♀ June 25, 1900, Fort Collins; ♂ July 31, 1900, Ridgway; ♂ ♀ June 16, 1900, Rocky Ford (E. D. Ball). 3 ♀ Aug. 12, 1925, Pagosa Springs (H. H. Knight). UTAH—♂ Sept. 17, 1925, Kaysville (G. F. Knowlton).

***Orthotylus ramus* new species.**

Suggestive of *chlorionis* Say, but size somewhat larger, pubescence pale yellowish; distinguished by the large and remarkably branched male genital claspers.

♂. Length 3.9 mm., width 1.5 mm. Head: width .71 mm., vertex .38 mm.; eyes and shape of head about as in the female of *chlorionis*. Rostrum, length 1.21 mm., reaching to middle of intermediate coxae. Antennae: segment I, length .29 mm.; II, 1.21 mm.; III, .77 mm.; IV, .44 mm.; yellowish green, last segment dusky. Pronotum: length .59 mm., width at base 1.12 mm.

Uniformly green or yellowish green, membrane pale, veins green. Clothed with simple pale yellowish pubescence. Genital characters distinctive, right clasper forked near base, forming two long, curved acuminate arms, the lower one curving across and nearly touching the dorsal prong of left clasper, while the dorsal arm curves inward and forward, to middle of genital segment; left clasper with dorsal prong near base, terminating above in a point which may have two or three small teeth, lower arm thicker, following the segment wall beyond median line where it curves inward to a point; dorsal margin of genital segment with a strong chitinous spine projecting posteriorly.

♀. Length 4.1 mm., width 1.54 mm. Head: width .74 mm., vertex .42 mm. Antennae: segment I, length .30 mm.; II, 1.36 mm.; III, .83 mm.; IV, .46 mm. Pronotum: Length .62 mm., width at base 1.15 mm. Very similar to the male in form, pubescence and coloration.

Holotype: ♂ June 22, 1918, Mercer County, Ohio (R. F. Hussey); author's collection.

Allotype: taken with type.

Paratypes: ♀, topotypic. ♀ July 3, 1920, Berrien County, Michigan (R. F. Hussey), taken on *Carya* sp. ♀ July 31, 1916, Batavia; ♀ July 8, 1920, Ithaca, New York (H. H. Knight), both specimens taken on hickory (*Carya*). ♂ June 24, 1897, Ames, Iowa (E. D. Ball).

Orthotylus ulmi new species.

Allied to *translucens* Tucker, but more robust, eyes more transverse on posterior margins; distinguished by the shorter rostrum which does not attain hind margins of intermediate coxae.

♂. Length 3.5 mm., width 1.2 mm. Head: width .71 mm., vertex .266 mm.; hind margin of head nearly transverse, eyes only slightly curved, large and prominent. Rostrum, length 1.09 mm., reaching a little over middle of intermediate coxae. Antennae: segment I, length .28 mm., thickness .089 mm.; II, 1.3 mm., thickness .059 mm.; III, .99 mm.; IV, .38 mm.; yellowish green last two segments fuscous, segment II sometimes dusky. Pronotum: length .44 mm., width at base .93 mm.

Uniformly green, head, scutellum, ventral aspect and legs, more yellowish green; membrane pale, veins green; tip of rostrum and apices of tarsi: fuscous. Clothed with simple pale yellowish pubescence, more than half of the hairs on hemelytra recumbent, suggestive of very fine sericeous pubescence. Genital claspers small, not easily distinguished from *translucens* without dissection.

♀. Length 3.5 mm., width 1.2 mm. Head: width .67 mm., vertex .326 mm. Antennae: segment I, length .29 mm.; II, 1.18 mm.; III, .84 mm.; IV, .37 mm. Pronotum: length .46 mm., width at base 1 mm. Very similar to the male in form, pubescence, and coloration.

Holotype: ♂ June 18, 1921, Phalen Park, St. Paul, Minnesota (H. H. Knight); author's collection.

Allotype: taken with the type.

Paratypes: 12 ♂ ♀, taken with the types on elm (*Ulmus* sp.). MINNESOTA—2 ♂ July 12, 1919, Hennepin County; ♀ July 10, 1924, Ramsey County (H. H. Knight). NEW YORK—♂ 4 ♀ July 19, 1916, Batavia; ♀ July 8, 1920, Ithaca (H. H. Knight), taken on *Ulmus* sp. ♀ Aug. 1-7, Wanakena (C. J. Drake). ONTARIO—♀, "Ottawa." QUEBEC—♂ July 28, 1915, Roberval (G. Beaulieu).

Orthotylus ute new species.

Aspect suggestive of *ornatus* Van D., but more elongate and the basal angles of pronotal disk fuscous; genital claspers indicate a relationship with *affinis* Van D., but right clasper with basal prong produced dorsally into a thick prong which forms a part of the crescent shaped hook.

♂. Length 6.6 mm., width 1.9 mm. Head: width 1.01 mm., vertex .37 mm. Rostrum, length 1.74 mm., nearly attaining hind margins of intermediate coxae. Antennae: segment I, length .64 mm.; II, 2.25 mm.; III, 1.12 mm.; IV, .62 mm.; black. Pronotum: length .86 mm., width at base 1.6 mm.

Clothed with rather prominent, suberect, pale yellowish pubescence. Dorsum fuscous to black, embolium, basal half of corium, and cuneus pale translucent; mesoscutum except lateral declivities, and more or less broadly on middle and apex of scutellum, yellowish to pale; calli and basal angles of pronotal disk fuscous to black; head pale, frons except spot on median line, tylus except apex, and lora, fuscous to black; collar, a broad ray across top of coxal cleft and extending to spread along basal margin to humeral angles, blackish; metapleura,

side of venter, and base of genital segment, blackish. Membrane and veins fuscous, paler on middle and apically. Coxae pale, femora greenish, tibia dusky, tarsi fuscous. Genital claspers distinctive, suggestive of *affinis* in the half crescent formed by the apical half, but basal prong produced dorsally into a thick arm, while the apical half of crescent is thicker, blunt at apex and bearing a single small spine. Left clasper with the basal prong short, produced much like a large blunt tubercle.

♀. Length 6.5 mm., width 2 mm. Head: width 1 mm., vertex .50 mm. Antennae: segment I, length .64 mm.; II, 2.22 mm.; III, 1.21 mm.; IV, .62 mm. Pronotum: length .89 mm., width at base 1.66 mm. Very similar to the male in pubescence, but coloration somewhat paler, the dark color on pronotum more restricted to basal angles and posterior margins of calli; clavus more fuscous brown, while the pale areas of the corium are here more extended.

Holotype: ♂ August 11, 1925, Ute Creek, Fort Garland, Colorado (H. H. Knight); author's collection.

Allotype: same data as the type.

Paratypes: ♂ 2♀, taken with the types on alder (*Alnus* sp.). ♀ Aug. 7, 1925, Stonewall, alt. 8500 ft., near Trinidad, Colorado (H. H. Knight), swept from *Populus latifolia* which grew near alders. ♀ July 23, 1907, Pine, Colorado (C. A. Hill). ♀ July 18, Park County, Montana (A. A. Nichol). ♀ July 20-25, 1920, Yellowstone National Park, Wyoming (A. A. Nichol).

***Orthotylus piceicola* new species.**

Distinguished by the small size, fuscous and green coloration, and remarkably developed male genital claspers; dorsum of male fuscous, with cuneus only greenish; female dorsum green, head, calli, and scutellum only fuscous.

♂. Length 4.4 mm., width 1.4 mm. Head: width .72 mm., vertex .355 mm. Rostrum, length 1.15 mm., scarcely attaining hind margins of intermediate coxae. Antennae: segment I, length .29 mm.; II, 1.06 mm.; III, .68 mm.; IV, .38 mm. Pronotum: length .58 mm., width at base 1.11 mm.

Color fuscous black, cuneus green to fuscous; lora, genae, rostrum except apex, and legs green or yellowish green, tibiae more or less fuscous; membrane and veins uniformly dark fuscous. Clothed with yellowish to fuscous, simple, recumbent pubescence. Genital claspers distinctive, left clasper forming three prongs, basal prong curved above along segment wall, acuminate, the apex curved backward to near tip of oedaeus; the ventral main trunk attaining tip of genital segment where it divides, forming two widely divergent, acuminate prongs, one of which points distad. Right clasper moderately broad, a thick prong at base which curves above to near median line, its apex abruptly acute; distal portion of clasper rounded below, the dorsal margin continued in a narrower and somewhat flattened, downcurved point, the outer margin of which bears several small teeth.

♀. Length 4.3 mm., width 1.4 mm. Head: width .75 mm., vertex .38 mm. Antennae: segment I, length .29 mm.; II, 1.12 mm.; III, .74 mm.; IV, .35 mm. Pronotum: length .59 mm., width at base 1.18 mm. More green than the

male, ventral surface, pronotum except calli, and the hemelytra green, the shade of green very near that of spruce needles; membrane and veins uniformly light fuscous; antennal segment II greenish to dusky, darker on base and apex.

Holotype: ♂ August 12, 1925, Wolf Creek Pass, Colorado (H. H. Knight); author's collection.

Allotype: ♀ August 8, 1925, above Stonewall, alt. 9000 ft., near Trinidad, Colorado (H. H. Knight).

Paratype: ♀, taken with the allotype on spruce (*Picea* sp.). Dr. C. J. Drake also took two specimens on spruce.

***Orthotylus nyctalis* new species.**

Allied to *lateralis* Van D., very similar in color but form more slender; differs chiefly in structure of male genital claspers.

♂. Length 5.1 mm., width 1.4 mm. Head: width .86 mm., vertex .266 mm. Rostrum, length 1.33 mm., slightly exceeding middle of intermediate coxae. Antennae: segment I, length, .35 mm.; II, 1.62 mm.; III, broken; fuscous black, segment II uniformly dusky yellow. Pronotum: length .56 mm., width at base 1.24 mm.

Coloration nearly as in *lateralis*; differs chiefly in the genital claspers. Left clasper more slender and with two short dorsal prongs where *lateralis* has only one; right clasper decurved on apex and devoid of spines, dorsal margin with a single prominent spine at basal-third, and two other spines just before the decurved apex.

Holotype: ♂ July 8, 1921, University Farm, St. Paul, Minnesota (Wm. E. Hoffman), collected at light; author's collection. A teneral female specimen is at hand, Aug. 14, 1924, Cranberry Lake, New York (E. A. Hartley), but it is not fit for description.

Orthotylus lateralis Van Duzee. This species is at hand from Illinois and Minnesota, while it has been recorded previously only from Kansas and Colorado as given in the original description. Records: ♂ June 25, 1921, University Farm, St. Paul, Minnesota (Wm. E. Hoffman), collected at light. ♀ July 21, 1912, Willow Springs, Illinois (W. J. Gerhard), collected on poplar. Very likely this species will be found to breed on poplar since it differs widely from the *Salix* inhabiting species.

Orthotylus compsus Reuter, Ofv. Finska Vet.-Soc. Forh., xlix, 1906-1907, No. 5, p. 14.

I took four female specimens July 1, 1917, Helotes, Texas, which agree in every particular with the description of *compsus* Reuter. The species was described from Jamaica, from a single specimen collected by Mr. Van Duzee, and as far as I am aware it has not since been recorded elsewhere. This species is distinguished by its small size (length 2.3 mm.), yellowish ground color, the hemelytra, including cuneus and areoles, marked with numerous irregular coagulated spots of bluish green; clothed with prominent simple, pale yellowish pubescence; antennal segment II just equal (♀) to width of pronotum at base.

TWO NEW SAWFLIES OF THE GENUS *ARGE*.*

BY W. G. GARLICK,
Vineland Station, Ont.

***Arge criddlei* n. sp.**

Female. Length 8-9 mm. Body shining black clothed with whitish hairs; the following parts rufous; palpi, middle of mandibles usually, labrum, antennae except the two basal segments above (in some specimens the two basal segments are entirely dark), legs beyond trochanters, and abdomen beyond the basal plates. Segments 2-5 of the abdomen above with dark transverse bands across the middle most pronounced on basal segments and decreasing apically. Wings yellowish with stigma and veins, except costa, brownish. Clypeus emarginate, in some specimens roundly in others with a slight angle; carina sharp, median fovea broken above, sloping evenly to median ocellus; first segment of antennae longer than second, third subclavate. Head and thorax, except pronotum, with fine punctures; pronotum rugulose; sheath normal for the genus; hind basitarsi about equal in length to the three following segments combined.

Male. Length 7-8 mm. Closely resembles the female but the bands on the abdomen are less marked.

Holotype—♀, Aweme, Manitoba, July 10, 1925, No. 2536 in the Canadian National Collection, Ottawa.

Allotype—♂, same data as above.

Paratypes—17 ♀'s, 4 ♂'s, same data as above.

This species answers to Norton's (1) variety *c* of *clavicornis* Feb. but is smaller and the head and thorax are not greenish-black. It differs from *onerosa* MacG. (2) in the black markings on the tergum of the abdomen and in its smaller size.

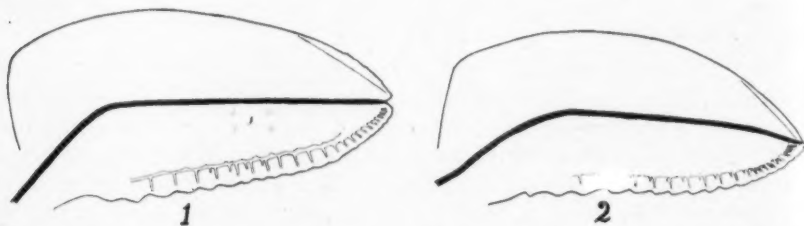


Fig. 1—*Arge criddlei*, saw of ♀, lateral view. Fig. 2—*Arge imitans*, saw of ♀, lateral view.

***Arge imitans* n. sp.**

Female. Length 7-8 mm. Head black with the following parts rufous; palpi, mandibles in the middle, clypeus, and third segment of antennae. Thorax rufous with the middle of the pronotum and all of the metathorax black. Coxae and femora dark, nearly black; apices of femora above, tibiae and tarsi, all rufous, the tarsi darker apically. Abdomen rufous with a dark spot on the middle of each segment above, most pronounced on apical segments. Wings yellowish with stigma and veins, except costa, brownish. Clypeus roundly, rather shallowly emar-

*—Contribution from the Entomological Branch, Department of Agriculture, Ottawa, Canada.

(1) Trans. Am. Ent. Soc., I, 1867, p. 68.

(2) Psyche, XXX, 1923, p. 80.

ginate; carina not sharp, median fovea with sharp lateral walls broken above and sloping evenly to median ocellus; first segment of antennae longer than second; head, except a narrow region above and on the outside of the eyes, with fine punctures; thorax with sparse punctures except pronotum which is similar to the head. Hind basitarsi about equal in length to the three following segments combined.

Male. Length 7 mm. Closely resembles the female. The claspers are dark.

Holotype.—♀, Aweme, Manitoba, July 10, 1925; No. 2537 in the Canadian National Collection, Ottawa.

Allotype.—♂, same data as above.

Paratypes.—2 ♀'s, 1 ♂, same data as above.

SYNONYMICAL NOTES ON SEVERAL OTIORHYNCHID WEEVILS. (COLEOPTERA).

BY L. L. BUCHANAN,

Washington, D. C.

Brachyrhinus rugosostriatus Goeze (*rugifrons* of American writers, in part, not Gyllenhal).

The widely distributed species which is usually listed as *rugifrons* Gyll., and which has recently attracted some attention on the Pacific Coast as a strawberry weevil, proves to be *rugosostriatus* Goeze. The true *rugifrons* seems to be confined to eastern Canada, a series from Sydney, Nova Scotia (1894) in the Canadian National Collection being the only North American examples of this species seen; *rugosostriatus*, on the other hand has a wide distribution, ten states and three Canadian provinces being represented among the 90 specimens examined. A part of this material (from Seattle, Wash., and Salem, Ore.) is labelled as having been reared from strawberry. It is safe to say that practically all the American records for *rugifrons* excepting the Nova Scotian one by Harrington (Can. Ent., vol. 23, 1891, p. 22 and p. 114.) properly refer to *rugosostriatus*. Descriptions of, and other references to, *rugosostriatus*, under the name *rugifrons*, can be consulted in Leconte and Horn, "Rhynchophora," 1876, p. 61; Blatchley and Leng, 1916, p. 112; Essig, "Insects of Western North America," 1926, p. 494; Colcord, "Index of American Economic Entomology, 3, 1925, p. 60; and Chittenden's historical sketch, (Can. Ent., vol. 57, 1925, p. 290). A characteristic figure is included in the last named paper. Both species are introductions from Europe.

The chief differences between the two species are as follows:—

1. Length, 6-7½ mm.; color reddish to piceous-black; femora mutic; antennae slender, the outer segments elongate; rostrum sulcate along middle above, and feebly set off from head in profile; pronotum evenly tuberculate over entire surface; elytra more oblong *rugosostriatus* Goeze.

Specimens seen from CANADA: Nova Scotia (Smith's Cove); Ontario (Toronto); B. C. (Agassiz).

UNITED STATES: Va. (Fredericksburg); Md. (Hagerstown); D. C.; Pa. (Bethlehem); N. Y. (Ithaca and Phoenicia); Mich. (Manistee); Colo. (Mont-

rose); Utah (Logan); Oregon (Oswego, Portland, and Salem); Washington (Seattle, Everett, Tacoma, Washougal, and Felida.).

- 1a. Length, 4-5 1/2 mm.; deep black throughout; femora with a small tooth; antennae stout, outer segments moniliform; rostrum and head continuous in profile; alae more abruptly dilated; front of head and upper surface of rostrum closely, longitudinally strigose, the latter not sulcate along middle; eyes nearly flat, more lateral in position and more widely separated above; no interocular fovea; pronotal tubercles more or less coalescent, especially at middle, to form short, sinuous, irregular rugae. In some specimens the middle of the pronotum is very coarsely punctate, the sides tuberculate. Elytra suboval, with smaller, more irregular tubercles, and a double row of shorter hairs, along each interval. Sydney, Nova Scotia *rugifrons* Gyllenhal.

The writer is indebted to Mr. Hopping, Mr. Lane, Mr. Wilcox, and Professor Wickham, for the loan of *Brachyrhinus* material.

Trigonoscuta pilosa Motschulsky (*Panormus setosus* Casey).

Casey's description was based on a partially abraded male of *T. pilosa*. *Dichoxenus setosus* Blatchley (*Anametis setosus* Blatch.).

Horn's genus *Dichoxenus* has received practically no mention since its description in 1876, so that the above change in generic assignment seems worth recording. The Texan *D. setiger* Horn is closely allied to *setosus* Blatchley (Illinois and Indiana) but in the former the elytral setae are thinner and considerably longer, and the first and second funicular segments slightly thicker.

NEW NEARCTIC CRANE-FLIES (TIPULIDAE, DIPTERA). PART XII.

BY CHARLES P. ALEXANDER,
Amherst, Mass.

The preceding part under this general title was published in 1921 (Can. Ent., 53: 132-137). The species discussed at this time are all included in the very extensive series of these flies belonging to the Canadian National Collection and kindly sent to me for determination by Mr. Curran. I am greatly indebted to Mr. Curran, and to the various collectors of the material, for the opportunity of studying this important series of specimens.

Tipula accurata n. sp.

General coloration gray, the praescutum with four brown stripes; antennal flagellum dark brown; femora yellow, the tips broadly dark brown; wings strongly tinged with brown, conspicuously variegated with white before and beyond the stigma; male hypopygium large and conspicuous.

Male.—Length, about 12.5-15 mm.; wing, 12.2-15 mm.

Female.—Length, about 11 mm.; wing, 11 mm.

Frontal prolongation of the head shiny brown, more yellowish laterally; nasus short and stout; palpi black. Antennae with the scapal segments yellow, the first segment elongate; flagellum dark brown. Head brownish gray, clearer gray on the frontal portion and orbits, with a broken capillary darker vitta.

Pronotum brownish gray, conspicuously setiferous, the scutellum narrowly china-white. Mesonotal praescutum gray or brownish gray, with four darker brown stripes, the long intermediate pair not quite attaining the suture; lateral

stripes shorter; besides these usual four stripes, a shorter brown line on either side in front, not connected with the lateral stripes; scutum gray, each lobe with two brown areas; scutellum pale brown; postnotum more grayish. Pleura dark, pruinose. Halteres yellow, the knobs dark brown. Legs with the coxae pale, pruinose; trochanters yellow; femora yellow, the tips broadly dark brown; tibiae brownish yellow, the tips more narrowly darkened; basitarsi brownish yellow, the tips and remainder of the tarsi dark brown. Wings with a strong brownish tinge, conspicuously variegated with whitish in the vicinity of the cord and beyond the stigma; stigma oval, darker brown; basad of the cord the white areas continue along the main veins, restricting the ground-color to elongate streaks in the centers of the cells; the white area beyond the stigma occupies cell 2nd R_1 and the broad bases of cells R_2 and R_3 ; obliterative areas along the cord conspicuous; veins dark brown, paler in the whitened areas. Venation: R_s relatively long; tip of R_2 entirely preserved; cell M_1 a little less than twice its petiole; distal section of Cu_1 strongly bent at tip.

Abdomen obscure yellow, the tergites with three interrupted brown stripes; sublateral stripes conspicuous, becoming obsolete beyond the fifth segment; lateral margins broadly, caudal margins narrowly pale; sternites yellow, with a broad, more nearly entire black stripe; hypopygium very large, compressed, obscure brownish yellow. Male hypopygium with the ninth tergite a large flattened plate, with a very deep linear median notch, the lateral lobes thus formed obliquely truncated. Outer dististyle small, elongate, cylindrical. Inner dististyle small. Ninth sternite and basistyle relatively small, the latter complete, largely pale, the sternite with a large fleshy pale lobe immediately ventrad and caudad of the basistyle, these lobes hanging pendant, their lower ends provided with dense brushes of rather short reddish setae. Eighth sternite very extensive, jutting caudad, each caudo-lateral angle produced into a short lobe that bears a dense brush of long pale setae and a strongly sinuous spine or fascicle of bristles. Female with the valves of the ovipositor elongate, chitinized, the margins smooth.

Habitat.—British Columbia, Alberta.

Holotype, ♂, Keremeos, B. C., August 1, 1923 (C. B. D. Garrett).

Allotopotype, ♀, August 2, 1923.

Paratopotypes, 7 ♂'s, June 26—July 15, 1923; *paratypes*, 2 ♂'s, Banff, Alta., August 7-18, 1922 (C. B. D. Garrett); 1 ♂, Waterton Lakes, Alta., July 15, 1923 (J. McDunnough).

Most closely allied to *T. barbata* Doane, differing in the genitalic characters.

***Tipula subbarbata* n. sp.**

General coloration gray, the praescutum with four narrow brown stripes; antennal flagellum black; femoral tips narrowly dark brown; wings with a gray suffusion, conspicuously variegated with white before the cord; abdomen yellow, the tergites trivittate with black; male hypopygium with the ninth tergite large, the caudal margin broadly emarginate, with a smaller median incision.

Male.—Length, 10.5-12 mm.; wing, 9.8-12.8 mm.

Female.—Length, 12.5-14 mm.; wing, 10.5-12.5 mm.

Frontal prolongation of the head above shiny brown, more yellowish later-

ally and below; nasus long and distinct. Antennae with the scapal segments yellow, the flagellum black. Head grayish brown, the posterior orbits broadly light gray, the cephalic portion similarly colored; occipital region brownish gray, transversely ringed with darker; a broken capillary darker brown median vitta.

Pronotum brown, darker medially, the scutellar lobes bright yellow. Mesonotal praescutum brownish gray, with four darker brown stripes, the intermediate pair darker; lateral stripes paler; a triangular brown area occupying the humeral region of the prescutum cephalad of the lateral stripes; scutum gray, each lobe with two brown marks; scutellum and postnotum gray, the former with a capillary dark brown median vitta. Pleura gray, the dorso-pleural region light sulphur-yellow; a similar sulphur-yellow mark at base of halter. Halteres obscure yellow, the knobs dark brown. Legs with the coxae pale, sparsely pruinose; trochanters brownish yellow; femora yellow, the tips narrowly dark brown; tibiae obscure yellow, the tips broadly infuscated; basitarsi brownish yellow, darkened outwardly, the terminal tarsal segments uniformly dark brown. Wings with a grayish suffusion, the stigma darker; a conspicuous white area before the cord, extending from cell 1st R_1 into the base of cell M_3 ; a less distinct white area beyond the stigma; a brown cloud at the caudal margin of the wing; veins dark brown, the obliterative areas very extensive. Venation: Distal section of R_2 entirely preserved, the basal section long; cell 1st M_2 relatively long; m a little shorter than the petiole of cell 1st M_2 .

Abdominal tergites yellow, with three interrupted black stripes; caudal margins conspicuously light yellow, more evidently so on the outer segments; lateral margins of the tergites broadly but inconspicuously paler; sternites yellow with a broad median black stripe; hypopygium generally pale. Male hypopygium with the ninth tergite extensive, the caudal margin broadly emarginate, with a very narrow median split. Outer dististyle long and slender, with conspicuous setae. Inner dististyle a flattened pale blade, the caudal margin of which bears a single gently curved spine. Eighth sternite with a dense brush of setae on either side of the median line. Ovipositor with the valves unusually large and deep, their margins smooth.

Habitat.—Saskatchewan, Alberta.

Holotype, ♂, Saskatoon, Saskatchewan, August 17, 1926 (Kenneth M. King).

Allotopotype, ♀, August 27, 1925 (K. M. King).

Paratopotypes, ♀, July 26, 1925; ♂, August 2, 1923 (K. M. King); *paratypes*, 20 ♂ ♀, Alberta, without exact data (E. H. Strickland), in the collection of the University of Alberta.

The closest relative is *T. barbata* Doane, which is readily separated by the structure of the male hypopygium, especially of the inner dististyle.

***Tipula imbellis* n. sp.**

General coloration gray, the praescutum with four narrow brown stripes; antennal flagellum beyond the first segment black; femoral tips darkened; wings gray, without a conspicuous pattern except a whitened area before the cord; male hypopygium with the basistyle produced caudad into a slender point.

Male.—Length about 9.5 mm.; wing, 9.6 mm.

Frontal prolongation of the head shiny brown above, brownish yellow laterally, the nasus distinct; palpi dark brown. Antennae with the scapal segments yellow; first flagellar segment brownish yellow; remainder of flagellum black, the segments without conspicuous basal enlargements; antennae of moderate length, if bent backward, extending about to the base of the abdomen. Head dark gray, lighter in front and along the posterior orbits; a capillary brownish black median vitta.

Pronotum brown, the narrow scutellar lobes china-white. Mesonotal praescutum gray with four narrow but conspicuous brown stripes, the intermediate pair narrowly separated for their entire length by a darker gray vitta; lateral stripes reaching the suture; humeral region narrowly margined externally by a pale line, this, in turn, bordered by a darker area lying just cephalad of the lateral stripes; lateral margins of the sclerite of this same color; scutum gray, each lobe with two dark brown areas; scutellum gray; postnotum gray. Pleura gray, the dorso-pleural region extensively buffy. Halteres yellow, the knobs dark brown. Legs with the coxae gray; trochanters yellow; femora yellow, the tips rather narrowly but conspicuously dark brown; tibiae yellow, the tips narrowly darkened; basitarsi light brown, the tips and remainder of tarsi dark brown. Wings with a grayish tinge, the pattern much as in *T. accurata*, there being a conspicuous pale area before the cord, extending from cell 1st R_1 across cell 1st M_2 into cell M_3 ; no very evident pale area beyond the stigma; in the anal cells, the dark color is more evident and streaked in appearance, this coloration confined to the distal two-thirds of the cell; veins dark brown, the obliterative areas along the cord very extensive. Venation: Distal section of R_2 entirely preserved; cell 1st M_2 relatively long and narrow; petiole of cell M_1 about equal to m .

Abdominal tergites obscure yellow, with a relatively inconspicuous dorso-median stripe, best indicated on the basal segments; caudal margins of segments yellow, more conspicuous on the posterior segments; lateral margins broadly but less conspicuously pale, margined internally with a dusky line; sternites brownish yellow, the caudal margins of the segments pale; hypopygium concolorous with the remainder of the abdomen. Male hypopygium with the basistyle produced caudad into a long point, the tip of which is weakly blackened; posterior lobe of inner dististyle produced into a conspicuous structure that terminates in three long blackened horns, the outer larger; eighth sternite with a median brush of long yellow setae.

Habitat.—British Columbia.

Holotype, ♂, Osoyoos, May 18, 1923 (C. B. D. Garrett).

***Tipula bucera* n. sp.**

General coloration light yellowish brown, the praescutum with four dark brown stripes, the space between the intermediate stripes grayish brown; wings with a very pale brown tinge, with a conspicuous whitened area before the cord; cell M_1 shorter than its petiole; male hypopygium with the basistyle produced caudad into a slender point.

Male.—Length, about 12 mm.; wing, 13.5 mm.

Frontal prolongation of the head shiny testaceous, a little darker above; nasus distinct; palpi dark brown. Antennae relatively short, if bent backward not

attaining the wing-root; scapal segments yellow; flagellum brown, the first segment paler brown; basal enlargements of the flagellar segments small. Head light grayish brown, paler in front, the region of the anterior vertex with a small brown spot, in cases continued caudad to produce a capillary line.

Mesonotal praescutum light yellowish brown with four dark brown stripes, the space between the intermediate stripes more grayish brown; scutum light brown, the lobes with darker brown marks; scutellum small, brown; postnotum more grayish brown. Pleura testaceous, scarcely pruinose. Halteres relatively long, pale, the knobs a little darker, the base of the stem yellowish. Legs with the coxae pale; trochanters yellow; femora obscure yellow, the tips narrowly and indistinctly infuscated; tibiae brownish yellow, the tips very narrowly infuscated; tarsi darker brown. Wings with a very pale brownish tinge, with conspicuous whitened areas before the cord; stigma relatively small, oval, pale brown; veins pale brown, the obliterative areas extensive. Venation: Distal section of R_2 entirely preserved, with but few macrotrichiae; cell M_1 shorter than its petiole; cell M_3 sessile or short-petiolate; $m-cu$ on M_4 on short distance beyond the origin.

Abdominal tergites shiny brownish yellow, with a very slightly darker dorso-median line; caudal margins of the segments narrowly pale; a broken sub-lateral dark line, in cases restricted to isolated brown markings on the individual segments, narrowly lined with darker brownish black; sternites obscure yellow; hypopygium pale. Male hypopygium much as in *T. imbellis*, sp. n., the tergite being very short, the caudal margin narrowly chitinized. Basistyle conspicuously produced into a long acute spinous point. Posterior lobe of the inner dististyle greatly flattened and appearing as a pale blade, the caudal angle being produced into a long curved horn, a little longer and more curved than the spine of the basistyle.

Habitat.—Alberta.

Holotype, ♂, Banff, August 30, 1921 (C. B. D. Garrett).

Paratopotype, ♂.

Prionocera electa n. sp.

General coloration gray; praescutum yellowish gray with four dark brown stripes; pleura blue-gray; wings grayish white, the apical cells strongly infumed; a conspicuous white band before the cord.

Male.—Length, about 11.5 mm.; wing, 13 mm.

Frontal prolongation of the head relatively short, shiny dark brown above, the base blackened, the sides yellowish; nasus relatively short and stout; palpi dark brown, the extreme apex of the last segment paler. Antennae with the first segment yellowish brown, the second segment obscure orange; flagellum brownish black, the first segment paler at base; apex of each of flagellar segments one to nine ventrally produced to give a serrate appearance to the organ, the terminal segment abruptly smaller. Head in front and beneath silvery-white, more yellowish surrounding the antennal bases; vertical tubercle compressed, with a conspicuous black spot on either side, immediately behind the antenna; remainder of head yellowish gray, conspicuously dark brown medially.

Pronotal scutum gray, the scutellum and the anterior lateral pretergites bright yellow, narrowly margined internally with blackish. Mesonotal praescu-

tum yellowish gray with four dark brown stripes; humeral region restrictedly fulvous, the pseudosutural fovea deep, black; scutum yellowish gray, each lobe with two dark brown areas; scutellum dark gray, the parascutella brown; postnotum dark, light gray pruinose. Pleura bright blue-gray, the dorso-pleural membrane buffy-brown; an oblique raised welt on the pleurotergite obscure yellow. Halteres brownish yellow, the knobs black, their apices a little paler. Legs with the coxae bluish gray; trochanters obscure yellow; femora obscure yellow, the tips narrowly blackened; tibiae brownish black, the outer portions a little darker; tarsi black. Wings grayish white, the cells beyond the cord more strongly infumed, to produce a dimidiate appearance; wing-base and cells *C* and *Sc* more yellowish; stigma brown, the proximal end abruptly light yellow; narrow pale brown seams on most of the longitudinal veins; a broad white obliterative stripe extends across cells 1st *R*₁, the outer end of *R* and the base of 1st *M*₂, barely entering *M*₃, the veins traversed by this area similarly pale. Venation: Vein *R*₃ at margin is subequal to or even a little narrower than cell *R*₃.

Abdomen grayish brown, the basal segment clearer gray; a broad darker brown median stripe, interrupted by narrow grayish yellow posterior margins on tergites two to seven; lateral margins of segments broadly grayish; segments eight and nine blackened; terminal sternites dark gray, the caudal margins of the segments pale; sternite of the hypopygium and the outer dististyle chestnut-brown. Male hypopygium having the tergite with a conspicuous, narrow, lateral lobe on either side, these lobes directed caudad. Basistyle very small but complete. Outer dististyle large, broader at base, narrowed to the blunt tips.

Habitat.—Labrador.

Holotype, ♂, Hopedale, July 1, 1923 (W. W. Perrett).

***Phalacrocer a vancouverensis* n. sp.**

Wings with the distal section of *R*₂ preserved, very short, diverging strongly from *R*₂₊₃, cell *R*₂ at the margin being nearly one-half longer than cell *R*₃.

Female.—Length, about 13 mm.; wing, 12.6 mm.

Rostrum dark brown, pruinose; palpi black. Antennae black throughout; basal five or six flagellar segments oval, the others becoming more elongate-oval; terminal segment elongate, nearly twice the penultimate; verticils relatively long and conspicuous. Head dark brownish black, sparsely pruinose above, more heavily so beneath.

Mesonotum of the unique type black, any pruinosity normally present destroyed by discoloration, only the postnotum preserved naturally, heavily pruinose; scutellum dark, the parascutella pale brown. Pleura dark, heavily gray pruinose. Halteres obscure yellow, the knobs dark brown. Legs with the coxae dark, heavily pruinose, the apex of the posterior coxa pale; trochanters obscure yellow; femora brownish yellow, clearer yellow basally, the tips rather broadly dark brown; tibiae and basitarsi light brown, the tips narrowly darkened; remainder of tarsi dark brown. Wings with a strong brownish suffusion, the stigma only a trifle darker; veins darker brown. Venation: Distal section of *R*₁ preserved, opposite *r-m*; *r* very elongate, the proximal two-thirds provided with numerous macrotrichiae (about a dozen), the distal third glabrous; *R*₂₊₃ subperpendicular at origin; basal section of *R*₂ short, the distal section entirely preserved,

short, divergent from R_{2+3} , cell 2nd R_1 at margin being longer than cell R_3 but shorter than R_2 ; cell R_2 nearly one-half longer than cell R_3 ; $r-m$ distinct; petiole of cell M_1 about equal to the element closing cell 1st M_2 , this latter cell narrowed outwardly.

Abdominal tergites light yellowish brown with a conspicuous black median stripe, the first segment uniformly darkened, pruinose; sternites brownish yellow with a similar blackish median vitta; caudal margins of the segments narrowly pale, more broadly on the outer segments. Ovipositor with the valves relatively long, flattened, obscure fulvous; tergal valves with the tips subacute, the caudal margins microscopically serrulate.

Habitat.—British Columbia.

Holotype, ♀, Vancouver, April 10, 1922 (W. B. Anderson).

In *Phalacrocera replicata* (Linn.) and *P. neoarena* Alex., the other species having the distal section of vein R_2 preserved, this element is longer and does not diverge strongly from R_{2+3} , cell R_2 at the margin being narrower than cell R_3 ; $r-m$ obliterated by the fusion of R_{4+5} on M_{1+2} .

***Limnophila* (*Phylidorea*) *fuscovenosa* n. sp.**

General coloration dark brown; antennal flagellum chiefly obscure yellow; legs brown; wings whitish subhyaline, all veins broadly and conspicuously seamed with brown; Sc short, Sc_1 ending before the fork of Rs .

Female.—Length, about 9.5–10 mm.; wing, 10–10.8 mm.

Rostrum gray, the palpi dark brown. Antennae with the first scapal segment dark brown, sparsely dusted; succeeding segments obscure yellow, only the outer flagellar segments passing into brown. Head dark brownish gray, brighter in front.

Pronotum dark brown. Mesonotum dark brown, the median area of the praescutum subglabrous to produce a broad median stripe, the remainder of the notum with a sparse yellowish gray pollen; scutellum behind a little more reddish brown. Pleura dark grayish brown, the dorso-pleural membrane a little paler. Halteres yellow, the knobs dark brown. Legs with the coxae brown; trochanters obscure yellow; femora light brown, the bascs narrowly obscure yellow; tibiae light brown, the tips narrowly infuscated; tarsi brown. Wings whitish subhyaline, the veins broadly and conspicuously bordered with brown; costal cell dark, only the proximal end a little paler; the brown seams include all the veins except the basal third of M , wider on the veins of the distal half of the wing and along the cord; stigma darker brown; wing-apex broadly infumed; veins darker brown. Venation: Sc unusually short, Sc_1 ending opposite the fork of Rs ; Sc_2 about three times Sc_1 , ending opposite the fork of Rs ; Rs relatively long for a member of this subgenus, a little shorter in the paratype; R_{2+3+4} shorter than the basal section of R_3 ; R_{2+3} sinuous, forming the lower border of the stigma; R_2 and R_{1+2} subequal; distal end of R_3 atrophied in the type; cell 1st M_2 relatively large; cell M_1 about one-half longer than its petiole; $m-cu$ more than its own length beyond the fork of M .

Abdominal tergites dark brown, paler laterally; sternites yellowish brown. Ovipositor with the genital segment dark, the elongate valves horn-colored.

Habitat.—Alberta, British Columbia.

Holotype, ♀, Banff, Alberta, July 19, 1922 (C. B. D. Garrett).

Paratype, ♀, Revelstoke, B. C., altitude 5000-6000 feet, July 20-21, 1926 (J. McDunnough).

***Gonomyia (Ptilostena) icasta* n. sp.**

Belongs to the *blanda* group; most closely allied to *G. (P.) coloradica* Alex., differing in the coloration of the body and wings and the short petiole of cell M_2 ; praescutum brownish gray, the humeral regions bright yellow; pleura dark with a conspicuous yellow longitudinal stripe; stigma brown.

Female.—Length, about 4.6 mm.; wing, 6 mm.

Rostrum and palpi brownish black. Antennae dark brown throughout; flagellar segments long-oval, becoming even more elongate outwardly. Head dark, pruinose.

Mesonotum badly injured in pinning, the praescutum chiefly brownish gray, the humeral region and anterior lateral pretergites light sulphur-yellow; pseudosutural foveae black; scutellum chiefly obscure yellow; postnotum grayish brown, the cephalic lateral angles of the mediotergite yellow. Pleura brown, more reddish brown ventrally, darker brown dorsally, with a broad conspicuous sulphur-yellow stripe extending from behind the fore coxae, passing beneath the base of the halteres, to the abdomen; dorso-pleural region yellow. Halteres yellow, the knobs infuscated. Legs with the coxae and trochanters pale brown; femora pale brown, the tips a little enlarged; tibiae brown, broken beyond their bases. Wings tinged with grayish, the short stigma brown, relatively conspicuous; veins still darker brown. Venation: Sc_1 ending about opposite two-thirds the length of the long arcuated Rs ; basal section of R_2 represented by a weak spur on R_{2+3+4} , the latter about one-third R_{3+4} ; R_1 short, nearly transverse, fused back from the wing-margin for a short distance with R_{1+2} ; R_4 elongate but shorter than Rs , the tip turned slightly cephalad; second section of M about one-fourth longer than the second section of M_2 (petiole of cell M_2).

Abdominal tergites light brown, the sternites a trifle paler, the outer segments with the extreme caudal margins yellow. Ovipositor with the valves horn-colored.

Habitat.—Alberta.

Holotype, ♀, Banff, June 5, 1922 (C. B. D. Garrett).

***Rhabdomastix (Sacandaga) subcaudata* n. sp.**

General coloration dark brownish gray; legs brownish black; wings tinged with pale gray, the stigma darker; Sc_2 atrophied; basal section of R_2 faint but distinct.

Female.—Length, about 5 mm.; wing 6.2 mm.

Rostrum, palpi and antennae black. Head dark brownish gray.

Mesonotum dark brownish gray, the praescutum with two closely approximated intermediate brown stripes that are not conspicuous against the dark background; scutellum paler reddish brown behind. Pleura dark brownish gray. Halteres dirty white, the knobs a trifle darker. Legs with the coxae small, dark brown; trochanters obscure yellowish brown; remainder of legs brownish black, the femoral bases scarcely paler. Wings with a pale grayish tinge, iridescent, the base narrowly whitish; stigma pale brown; veins darker brown. Macrotri-

chiae sparse, on R_4 and R_5 except at extreme base; none on R_{2+3+4} , R_{2+3} , R_2 or R_3 ; a couple at end of R_s ; no other trichiae basad of cord except on C and R . Venation: Sc_2 atrophied; Sc_1 ending immediately before the fork of R_s ; R_{2+3+4} and R_{2+3} subequal; basal section of R_2 faint, about one-half as long as R_{1+2} ; distance on costa between tips of R_{1+2} and R_3 subequal to or longer than the latter vein alone; R_4 gently arcuated; cell 1st M_2 relatively small; $m-cu$ somewhat variable in position, always beyond the fork of M , from one-sixth to more than one-half its own length.

Abdomen dark brown, the long tergal valves of the ovipositor light horn-color, the sternal valves paler.

Habitat.—Alberta.

Holotype, ♀, Moraine Lake, August 2, 1923 (J. McDunnough).

Paratopotype, ♀, August 4, 1923.

R. (S.) subcaudata belongs to the group containing *caudata* Lundbeck (Greenland-Baffinland) and *monticola* Alex. (British Columbia), in which the basal section of R_2 is distinctly preserved. It differs from *monticola* in the larger cell R_3 , position of $m-cu$ and the more abundant trichiation of the veins. It differs from the species I have determined as being *caudata* (Signuia, Baffinland) in the atrophy of Sc_2 . It is possible, however, that the true *caudata* (described from Southern Greenland, Lat. 61° , $5'$ N.) may be still a different species. It is quite evident that there are rather numerous species of these Arctic and Subarctic species of *Rhabdomastix*.

***Rhabdomastix (Sacandaga) subfasciger* n. sp.**

General coloration gray, the praescutum with four brown stripes, the lateral pair very faint and poorly defined; wings gray, the stigma and seams along the cord and vein Cu_1 brown; R_3 very short, transverse, far remote from R_{1+2} at wing-margin; R_4 longer than the space between the fork of R_s and the origin of R_3 .

Male.—Length, about 5-5.5 mm.; wing, 6-6.8 mm.

Female.—Length, about 7-8 mm.; wing, 7.5-8.5 mm.

Rostrum and palpi dark. Antennae dark throughout. Head gray.

Pronotum blackish, gray pruinose; anterior lateral pretergites obscure yellow. Mesonotum brownish gray, the praescutum behind with four brown stripes, the lateral stripes only poorly defined, the intermediate pair more distinct and widely separated; pseudosutural foveae and tuberculate pits black; cephalic portion of sclerite more uniformly gray. Pleura gray, including the dorso-pleural membrane. Halteres short, pale yellowish white. Legs with the fore coxae gray, the other coxae brightened apically; trochanters obscure yellow; femora light brown, brighter at base, darkened outwardly; tibiae brown, the tips narrowly darker; tarsi dark brown. Wings with a grayish suffusion, the base more whitish; stigma, a seam along the cord and a similar seam along vein Cu_1 in cell M light brown; a narrow and inconspicuous seam at outer end of cell 1st M_2 ; veins dark brown. Venation: Sc_2 close to the tip of Sc_1 ; R_3 very short, transverse, only about one-half to two-thirds the distance on the costal margin between veins R_{1+2} and R_3 ; R_4 longer than the serial vein R_{2+3+4} and R_{3+4} (the

basal section of R_2 being entirely atrophied); $m-cu$ oblique in position, but less so than in *fasciger*.

Abdomen dark brownish gray, including the hypopygium.

Habitat.—Alberta.

Holotype, ♂, Banff, August 7, 1922 (C. B. D. Garrett).

Allotopotype, ♀, August 3, 1922.

Paratopotypes, 10 ♂ ♀, July 18-August 22, 1922.

R. (S.) subfasciger is very similar in its general appearance to *R. (S.) fasciger* Alex. (California), differing in the details of coloration and venation, such as the shorter Sc_1 and R_s and the less oblique $m-cu$.

THE LEPIDOPTERA OF THE SETON LAKE REGION, BRITISH COLUMBIA.*

BY J. McDUNNOUGH,

Ottawa, Ont.

(Continued from page 162)

SPHINGIDAE

Smerinthus cerisyi ophthalmicus Bdv. Four ♂, two ♀, June 24, 25, July 5, 13.

Paonias myops occidentalis Clark. One ♂, June 2.

Haemorrhagia diffinis rubens Hy. Edw. Three ♂, June 5, 6, July 7.

Proserpinus clarkiae Bdv. One ♀, captured in the daytime at D'Arcy, Anderson Lake, on June 17.

ARCTIIDAE

Bruceia pulverina Neum. One ♀, July 8. This is the first Canadian specimen I have seen and I am not sure whether it has been recorded from British Columbia before.

Halisidota maculata angulifera Wlk. One ♀, July 5.

Hyphantria textor Harr. One ♂, June 6.

Apantesis elongata Stretch. The species was not uncommon on the higher slopes of Mt. McLean on July 12 flying rapidly in the sunshine and very difficult to catch; I obtained five ♂ and one ♀. The name was based on a ♀, this sex having yellow secondaries, and it seems fairly certain that *diecki* Neum. is merely the ♂ sex of the same species, which has white secondaries. The type locality for *diecki* is given as Spence's Bridge and is probably a similar instance to that noted under *Parnassius nanus* where the specimens were taken at a much higher altitude in the vicinity, in which case my McLean series would be nearly topotypical for *diecki*. There are a few Calgary specimens in the Canadian National Collection bred by Wolley-Dod and I bred several ♀ ♀ from eggs obtained at Waterton Lakes, Alberta in 1923. From a comparison of the larvae with those of *blakei* Grt. from Manitoba I should say that *elongata* is a distinct species; the larvae are nearly entirely black and lack the distinct pale dorsal line so noticeable in *blakei*.

Euchaetias oregonensis Stretch. One ♂, May 30; this specimen has the primaries pure white, but I can see no other distinction.

NOCTUIDAE

AGROTINAE

Euxoa oblongistigma Sm. Common in late June and early July. One or two specimens show a pale gray costal margin on primaries and may possibly belong to *plagigera*, but I cannot be certain until I have made genitalic slides.

Euxoa ridingsiana Grt. One ♂, July 14.

Euxoa infausta Wlk. Two ♀, July 5, 13, which agree excellently with Vancouver and Victoria specimens in the Canadian National Collection.

Euxoa perfusca cocklei Sm. One ♀, June 14; two other ♀, July 8, show only traces around the reniform of the pale scaling which characterizes *cocklei* but belong without much doubt either to this species or to *excogita* Sm.

Euxoa stigmatalis Sm. One ♀, July 13, seems best placed in this group.

Euxoa choris Harv. Not uncommon in the latter half of June and early July; not heretofore represented from British Columbia in the Canadian National Collection.

Euxoa mimallonis Grt. One ♂, July 14; the first record from British Columbia in our collections.

Euxoa messoria Harris. Two ♂, June 25, July 14.

Euxoa terrena Sm. Not uncommon; my series of eight specimens ranges in dates from June 1-July 5. All the specimens are much darker than the Utah specimens I have before me as *terrena* and it may be that the name *lagganæ* will have to be used for this darker form; I have however no Pullman, Wash. specimens (type locality for *terrena*) before me at the present time for comparison.

Euxoa atropulverea Sm. One ♂ ♀, June 13, 22, which I refer here following a comparison with the type by Mr. C. H. Curran. The primaries are more or less unicolorous deep smoky with a slight luteous tinge in the ♂ and with the ordinary lines darker and rather indistinct. The most characteristic feature of the maculation seems to be the pale ochreous shading on outer edge of the reniform.

Euxoa setonia n. sp.

♂. Antennae moderately serrate and fasciculate; vestiture of head and thorax deep smoky, of abdomen paler, tinged with ochreous, especially the anal tufts. Primaries pale ochreous gray, sprinkled with black, the black suffusion most pronounced in the median and terminal areas, leaving prominent pale areas at base and in subterminal region; basal $\frac{1}{2}$ line single, black; t. a. line broad, black, slightly outwardly oblique and rather finely and irregularly dentate; t. p. line black, strongly dentate on veins, rounded outwardly opposite cell and then inwardly oblique; median area largely blackish, due to a diffuse median shade which runs between the two spots and then spreads itself, covering the whole area above inner margin; orbicular round, pale, reniform also pale but somewhat obscured by the black shading, very close to t. p. line, claviform very slightly indicated by short black dashes; subterminal space pale with minute black speckles; terminal space blackish crossed by a faint, pale, irregularly dentate s. t. line; a broken black terminal line and a pale ochreous line at base of smoky fringes. Secondaries smoky, slightly paler basally, with pale fringes which in the basal half are tinted with ochreous. Beneath pale smoky, sprinkled

with ochreous along costal area of both wings and with a dark blotch on costa representing the inception of a postmedian line; fringes as above.

♀ Similar to ♂, but the median line is not so diffuse, merely broad and band-like, in consequence the median area is similarly colored to the remainder of wing; no claviform is present. Expanse 33 mm.

Holotype—♂, Seton Lake, B. C., July 2, (J. McDunnough); No. 2551 in the Canadian National Collection, Ottawa.

Allotype—♀, same locality, June 14.

Paratypes—Two ♀, Kaslo, B. C., July 20, (J. W. Cockle).

In the paratypes the thoracic vestiture is considerably paler, being ochreous rather than smoky, but the median area shows the same blackish suffusion as in my holotype. I have been able to find no name applicable to this rather striking form which apparently falls in the *quinquelinea* group.

***Euxoa macleani* n. sp.**

♀. Eyes quite small, surrounded by pale ochreous hairs; palpi shaded with smoky outwardly, pale ochreous inwardly; vestiture rather rough and composed of hair and hair-like scales, pectus and tegulae light smoky gray, thorax darker smoky gray; abdomen dark gray with ochreous hairs terminally. Primaries deep smoky gray with black cross-lines; basal half-line rather faint, consisting of two equal scallops; t. a. line upright, single, irregular below costa with a large scallop below cubitus, forming a decided inward angle in submedian fold and a smaller scallop above inner margin; median shade vague, outwardly oblique from costa to below reniform, then parallel and close to t. p. line; t. p. line dentate, excurved below costa and then rather rigidly inwardly oblique to inner margin; orbicular not defined, reniform vague, represented by a dark vertical streak each side of the median shade, the outer of these streaks shows slight pale ochreous scaling outwardly and is connected with t. p. line by an indistinct blackish bar; s. t. line defined by dark scaling, rather even and closer to outer margin than usual, with slight incurve above tornus; fringes concolorous with very faint pale basal line. Secondaries deep smoky with whitish fringes cut basally by a very faint smoky line. Beneath light smoky with obscure postmedian lines and discal dots on all wings; fringes as above. Expanse 34 mm.

Holotype—♀, Mt. McLean, B. C., (6500 ft.), July 12, (J. McDunnough); No. 1582 in the Canadian National Collection, Ottawa.

This obscure species appears to be closest in general appearance to *vallus* Sm. but is much smaller and narrower winged. The peculiar dark bar between reniform and t. p. line seems distinctive and the small eyes are also characteristic. The species is evidently a high altitude form of the *lutulenta* group but I can find no description to fit it.

***Euxoa lillooet* n. sp.**

♀. Head and thorax deep purplish gray with an admixture of black scaling and a faint black median line across the tegulae; edges of patagia and metathoracic tufts slightly brown-tinted; abdomen light gray. Primaries pale purplish gray, suffused, except in area before t. a. line, with deep purplish gray and with a distinct ruddy tinge in the lower median area. Basal half line geminate, black; t. a. line geminate, black, each line equally well-marked, slightly outward-

ly oblique with slight inward curves on cubital and anal veins but with no strong outward bulges; area before this line rather even pale gray and contrasting strikingly with the remainder of wing; t. p. line marked at costa by geminate dark dashes with pale filling, indistinct opposite cell, the inner line well marked, black and gently scalloped below reniform, preceded by a smoky median shade-line; median area pale on costa, blackish before and between spots and shaded with ruddy below cell; orbicular and reniform pale gray, contrasting, the former large, obliquely oval and somewhat open towards costa, the latter tending to broaden out at times below and send a spur backward along cubitus, claviform small, outlined in black; s. t. line indistinct, arising from a pale purplish apical patch and defined outwardly by smoky terminal shades, slightly dentate and bulging on veins three and four, a dark shade on costa near apex, rather sharply defining the above mentioned pale apical patch; remainder of subterminal area rather pale purplish, slightly darker than the basal area, faint dark broken terminal line and a pale line at base of smoky fringes. Secondaries smoky brown, with faint discal dot; fringes with an ochreous base followed by a smoky line and beyond that pale. Beneath pale smoky with a distinct dark postmedian line on both wings, a pre-apical dark blotch on costa of primaries and a small dark discal dot on secondaries. Expanse 35-39 mm.

Holotype—♀, Seton Lake, B. C., July 13. (J. McDunnough); No. 2552 in the Canadian National Collection, Ottawa.

Paratypes—Three ♀, same locality, June 29, 30, July 4; two ♀, Salmon Arm, B. C., July 10, 18 (A. A. Denny).

This species obviously belongs in the *declarata* group and I hesitated considerably before venturing to describe it as new. My series, however, is so remarkably constant in color and maculation and stands out so distinctly with the pale basal area and pale spots from the rather unicolorous, deep purplish brown females of *declarata* that I have finally decided to give it a name; from *verticalis* it is separated at once by the dark secondaries. I cannot make my specimens match the descriptions of either *abnormis* Sm. or *noctuiformis* Sm. both of which are unknown to me but are said to have the basal half of the tegulae dark brown.

Euxoa tessellata teselloides Grt. A few specimens were taken in late June or early July, mostly of the *focinus* type of coloration; one ♀, however, was considerably darker tending towards *atropurpurea*.

Euxoa idahoensis Grt. One ♀, July 14, belonging to the typical brown colored form.

Euxoa excellens Grt. Three ♂, two ♀, July 13, 14.

Euxoa brocha Morr. This species was appearing quite commonly just before my departure, a series of eight being captured between July 12 and 14.

Chorizagrotis auxiliaris Grt. One specimen, June 30.

Agrotis smithi Snell. One ♂, July 13. Our North American form is distinct from the European *baja* Fabr. according to genitalia.

Agrotis c-nigrum L. One ♂, June 6.

Agrotis rosaria Grt. One ♀, July 13.

Agrotis dislocata Sm. One small ♀, July 2, which apparently belongs to this species.

Agrotis plebeia Sm. Three ♂, July 8-13. This species is misplaced in its present position as the fore tibiae are entirely without spines and the genitalia are quite different.

Agrotis oblata Morr. Three ♂, two ♀, June 12, July 13, 14.

Agrotis piscipellis Grt. One ♂, five ♀, July 8-13. There is considerable variation in the coloration of these specimens, the ground color of primaries varying from red-brown to deep purple-brown. They are the first Canadian specimens which I have seen but the species may have been recorded by Blackmore in some of the reports of the British Columbia Provincial Museum.

Setagrotis cinereicollis planifrons Sm. Eleven specimens were taken during the first half of July and show considerable variation in the amount of ruddy suffusion on primaries. The ♂ genitalia differ somewhat from those of typical Colorado and Utah forms and this difference, if constant, may indicate a good species.

Agrotis haruspica inopinatus Sm. Not uncommon in early June. The specimens are variable and might just as well be placed under *sierrae* Harv. as under *inopinatus*; both I think are rather dubious races of *haruspica* which name should be used in place of *unimacula* Morr. preoccupied by *unimacula* Staud.

Epipsilia littoralis Pack. One ♂, June 30; also one ♀ on Mt. McLean, July 12.

Anomogyna speciosa arctica Zett. One ♂, July 12, on Mt. McLean (6000 ft.). This is the first authentic ♂ which I have seen from the west and it can be readily separated from *partita* McD. by the shape of the claspers. It is a very suffused specimen with no white filling in the t.a. and t. p. lines nor around the spots, these areas being dark gray, only slightly paler than the ground color. There are two ♀ before me (ex Wolley-Dod Collection) which agree, the one from Laggan, Alberta, July 14 and the other from "head of Pine Creek, Calgary, August 16."

Adelphagrotis indeterminata Wlk. Not uncommon about the second week in July.

Adelphagrotis stellaris Grt. One ♂, two ♀, July 14.

Matuta apposita Grt. One ♂, July 14.

Matuta prasina Fabr. One ♂, July 8.

Abagrotis erratica ornatus Sm. Common from about the second week in July.

Abagrotis rufipectus Morr. One ♀, July 13.

Abagrotis vittifrons Grt. One ♂, July 8.

Abagrotis duanca Sm. One ♂, July 4. This is the first Canadian record as far as I am aware.

Abagrotis nefascia Sm. Common in late June and early July.

Abagrotis forbesi Benj. There is a ♂ in the Canadian National Collection collected at Lillooet by Mr. A. W. A. Phair, August 23, 1921 which belongs to this species according to genitalia; the color of the primaries is a deep liver-brown with contrasting blue-gray terminal area and the size is smaller than typical Utah specimens. With this ♂ I am inclined to associate a ♀ taken at Seton Lake, July 13; this specimen has deep red-brown primaries much as in certain forms of

variata but is too small and with too even an s. t. line to be placed under this name.

***Abagrotis turbulenta* n. sp.**

♂. Antennae simple, palpi with the second joint dark brown outwardly; head deep gray-brown; tegulae and thorax light brown to deep gray, tegulae tipped with pale ochreous; slight divided mesothoracic tufts, tipped with smoky. Primaries with basal and terminal spaces light blue-gray, contrasting; median and subterminal areas light brown to smoky brown; maculation very clear-cut; basal half-line dark, geminate, t. a. line dark, geminate, filled with bluish, angled below costa and then slightly irregular and outwardly oblique; t. p. line geminate, but less distinct than t. a. line, pale-filled, bent outward below costa but rather less than usual and then rather straight to inner margin, followed on the veins by a series of black dots; orbicular and reniform large, concolorous or slightly darker than ground color, very distinctly outlined in ochreous, orbicular slightly oval, reniform with only slight median constriction, upright; no claviform or median shade; s. t. line only defined by the difference between brown subterminal and blue-gray terminal space, rather even, with slight outward angle below costa and a similar inward angle above tornus; a broken, dark, terminal line; fringes dusky. Secondaries deep smoky; fringes with ochreous basal line followed by a smoky band, outwardly pale. Beneath smoky with a slight ruddy tinge with a prominent dark subterminal costal dash on primaries and a large dark discal lunule on secondaries which also show traces of a smoky postmedian line; fringes as above. Expanse 33 mm.

Holotype—♂, Seton Lake, B. C., June 8, (J. McDunnough); No. 2556 in the Canadian National Collection, Ottawa.

Paratype—♂, same locality, July 12.

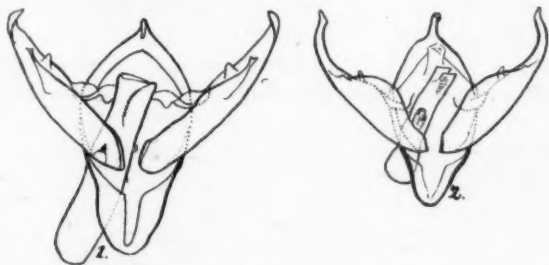


Fig. 1. Male genitalia of *Abagrotis turbulenta* n. sp.

Fig. 2. Male genitalia of *Abagrotis dodi* n. sp.

The genitalia are closest to those of *placida* but differ as follows: the narrow incurved apical portion of clasper is short and pointed (not hammer-shaped) and shows no excavation on lower margin at base; the harpe is larger and triangular; the armature of the aedoeagus consists of a distinct apical serrate band and a stout spine on a conical base, whereas in *placida* we find merely a weak spine without base and no apical serrate band. It may be this species which Benjamin mentioned in his revision (p. 154) as a variety of *placida* resembling *scopeops* but in my opinion the genitalia point to a distinct species, easily separable on maculation by the pale basal area.

In working over the series of *A. placida* in the Canadian National Collection and making slides of ♂ genitalia with a view to checking up on the preceding species I came across a small series from Calgary, Alberta, ex Wooley-Dod Collection, mixed in with typical *placida*, which showed a distinctly different habitus and also type of genitalia. These specimens are closest apparently to *trigona* Sm., showing the same concolorous terminal area on primaries but having longer and narrower wings. The genitalia differ in lacking any dorsal ridge on the juxta, and in having the narrow apical portion of clasper much longer, more bent inwards and with hammer-shaped apex; the strongly serrate apical band on the aedoeagus of *trigona* is much reduced and the small chitinous plate of the vesica lacks the sharp point and is more irregularly shaped. As the species appears to be new I describe it as follows:

***Abagrotis dodi* n. sp.**

♂. Antennae simple, finely ciliate; palpi and head smoky ochreous, the former shaded outwardly with deep smoky; thorax and primaries rather bright ochreous brown with slight smoky tinges especially subterminally and terminally; ordinary lines rather indistinct, the inception of the t. a. and t. p. lines on costa marked with a black spot, both faintly geminate with paler filling but the inner line of the t. a. and outer one of the t. p. line obsolescent, the course of the lines much as in *trigona*, the usual black dots following t. p. line; median shade either faint or lacking; orbicular small, oval, concolorous, ringed with pale ochreous; reniform also pale-ringed, rather small, slightly lunate and at times with a blackish shade in lower portion; s. t. line pale ochreous, distinct, due to slight dusky shading on both sides, straight below costa with slight incurve above tornus; a dark terminal broken line and smoky fringes. Secondaries smoky with ochreous line at base of fringes. Beneath smoky with ruddy tinges along costal areas, traces of a dark postmedial line, best marked on costa, especially of primaries; a variably distinct dark discal lunule on secondaries.

♀. What I take to be the ♀ has lighter, more ochreous primaries with the two spots showing darker and lacking distinct pale rings and the terminal area slightly paler than the subterminal one which is distinctly smoky at costa. The secondaries are paler basally, showing a faint trace of a subterminal dark line. Expanse 32 mm.

Holotype—♂, Head of Pine Creek, Calgary, Alta., July 10, 1896, (F. H. Wolley-Dod); No. 2557 in the Canadian National Collection, Ottawa.

Allotype—♀, same locality and collector, August 8, 1896.

Paratypes—Two ♂, same locality and collector, July 6, 10, 1896.

Abagrotis variata Grt. Five specimens, all of the dark olive-gray form, June 21, 28, July 4, 8, 14.

Abagrotis sambo Sm. Two ♀, July 13, 14; one of these is rather unicolorous deep orange-brown, but I think is correctly placed on account of the distinct terminal black dots.

Pronotua typica pyrophiloides Harv. Two ♂, four ♀, June 30, July 13, 14. These specimens are rather intermediate between the dark Californian *pyrophiloides* and the larger, paler Colorado *typica* but on the whole are closer to the former; judging by the genitalia the two names apply merely to races of a single species.

(To be continued)

BOOK NOTICES

General Catalogue of the Hemiptera. Edited by Dr. G. Horvath and Dr. H. M. Parshley. Fascicle I, Membracidae, by W. D. Funkhouser. Published by Smith College, Northampton, Mass., U. S. A. 1927.

A World Catalogue of the Hemiptera has now become a reality, at least in part, by the publication of Fascicle I, devoted to the family Membracidae. The catalogue occupies 581 pages and aims to include the complete synonymy, references, localities and bibliography of the described species of Membracidae. The arrangement is such as to illustrate the relationships between the subfamilies only, except in the Smiliinae where genera are grouped into tribes. The genera and species are arranged alphabetically with the references to each in chronological order followed by the synonymy. The synonyms are cross-indexed by recording each species under each genus in which it has ever been placed and there referring to its proper position.

In respect to the designation of genotypes the value of the Catalogue would have been enhanced if the author had indicated the exact reference to the type fixation and the class to which the genotype belongs, i. e. Ortho-, Lecto, etc., instead of affixing simply the word "Type."

Dr. Funkhouser, the author of Fascicle I is to be congratulated on his painstaking efforts and it is to be hoped that the remaining volumes of the Catalogue are of a standard equal in merit to the present work. G. S. WALLEY.

Guide to the Study of Fresh Water Biology. By J. G. and Paul R. Needham. Published by The American Viewpoint Society, New York and Albany, 1927.

This little work of 88 pages contains a mass of information invaluable to students of fresh-water biology. Part I consists of aids to a recognition of fresh-water organisms and contains keys to the orders and genera of aquatic insects, crustaceans, molluscs, lesser invertebrates and algae; it is richly illustrated with 24 plates depicting the various generic types. Part II contains suggestions for class work, briefly describing the necessary collecting apparatus, and giving a series of 25 practical exercises which should be very helpful to instructors in this branch of scientific investigation.

Researches in Polynesia and Melanesia. An account of Investigations in Samoa, Tonga, the Ellice Group and the New Hebrides in 1924 and 1925. By Patrick D. Buxton, assisted by S. H. E. Hopkins. Parts I-IV (Medical Entomology), 260 pages and 12 Plates, published by The London School of Hygiene and Tropical Medicine, price 10/6.

This interesting work is divided into four parts; part I is largely introductory and consists of a short description of the various islands, their geography and their flora and fauna; part II deals with the climate of Samoa; part III gives a list of the myriapoda, arachnida and insecta captured during field surveys, with particular attention to the Culicidae; part IV, which is the most important and largest, contains a detailed account of a number of experiments performed on the mosquitoes, *Aedes variegatus* and *Aedes argenteus* with a view to determining the factors controlling egg-laying, hatching of eggs, etc. As the former species is the carrier of the *Filaria* causing filariasis, a disease prevalent among the natives, these experiments were undertaken with a view to determining the best means of eradicating this pest; the work should be of much value to students of Culicidae and of medical entomology.

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